

REMARKS

The Examiner objected to claims 65 and 67 because of typographical errors. The claims have been amended, curing the defects.

The Examiner rejected claims 65-68 and 70-80 under 35 U.S.C. 101 as being directed to non-statutory subject matter. Applicant submits that as currently amended, claims 65-68 and 70-80 are directed to statutory subject matter.

The Examiner stated that claims 65-68 and 70-80 were drawn “*only to an abstract process that only manipulates data and, therefore, are not directed to statutory subject matter*”. Claim 65 has been amended to more explicitly tie the claimed method to hardware elements of (and calculations carried out by) a computer implementing the claimed method operating on data representing physical measurements. Accordingly, Applicant submits that claim 65 and the claims dependent therefrom are directed to statutory subject matter.

The Examiner rejected claims 65-68 and 70-80 under 35 U.S.C. 112, second paragraph. Applicant submits that as currently amended, claims 65-68 and 70-80 are not indefinite.

The Examiner stated that it was unclear if the data matrix recited in claim 65 comprises a plurality of measured values representing three different types of data or whether the matrix itself comprises the three different types of data. The Examiner also stated that the difference between “sample descriptive values” and “measurement descriptive values” was unclear “*as measurement values are necessarily 'descriptive' of the samples measured*”. The punctuation of claim 65 has been amended to make it clear that the data matrix comprises three different types of data. The claim has been further amended to specify that each sample descriptive value characterizes a corresponding sample independent of said measurements, and that each measurement descriptive value characterizes a corresponding type of measurement or measurement condition, independent of said samples.

The Examiner states that the step of "**calculating a pseudo-data vector** comprising one value for each of said samples," in claim 65 is indefinite as "*what actually comprises a 'calculation' is unclear*". The claim has been amended to remove the term in question. The specification of the current invention explains the meaning of the term pseudo-data vector in paragraphs 0064 and 0065, reproduced here for the Examiner's convenience:

[0064] The term "pseudo-data vector" refers to a vector containing pseudo values based on inputs by a user of the system, which is constructed for performing similarity sorts against actual data vectors generated from a dataset.

[0065] The term "pseudo-data" refers to data values generated for the construction of a pseudo-data vector for performing similarity sorts with respect to actual data. Pseudo-data is based on user input, and may be further dependent upon binary data relating to the actual data, or upon a selection from the actual data.

Applicant respectfully submits that the meaning of the claimed step regarding the generation of a pseudo-data vector as defined in the specification and comprising one value for each of said samples is clear.

The Examiner states that it is unclear "*how the assignment of the numerical data results in a calculated pseudo-data vector*" in the step recited in claim 66 of **calculating the pseudo-data vector by assigning numerical data values to a selected portion of said sample descriptive values**. The calculating requirement has been removed from the claim. Applicant draws the Examiner's attention to paragraph 0065 of the specification, reproduced above. Applicant submits that Claim 66 covers any method of generating the pseudo-data vector by assigning numerical values to the selected portions of the sample descriptive values. The inquiry under the second paragraph of 35 U.S.C. 112 "is merely to determine whether the claims do, in fact, set out and circumscribe a particular area with a reasonable degree of precision and particularity" (*In re Moore*, 169 USPQ 236, 238).

The Examiner states that it is unclear "*how the assignment of the pre-defined null value to said cell lacking a sample descriptive value results in a calculated pseudo-data vector*" in the step recited in claim 70. As noted above, the term calculation has been replaced with generation.

As noted above, the specification of the current invention explains the meaning of the term pseudo-data vector in paragraphs 0064 and 0065. Accordingly, Applicant submits that the meaning of the recited step is clear, and that hence, claim 65 and the claims dependent therefrom are not indefinite.

The Examiner rejected claims 65-67, 75, and 79-80 under 35 U.S.C. 103(a) as being unpatentable over Warrington et al. (P/N 6,884,578; no. 2 reference in IDS submitted 11/6/2008) in view of Rusterholz (US P/N 5,864,838) and further in view of Balaban et al. (6,185,561; no. 3 reference submitted in IDS 11/6/2008). Applicant submits that as currently amended, claims 65-67, 75, and 79-80 are not obvious in view of the cited prior art.

The Examiner states that Warrington teaches all the limitations of claims 65 and 75 except for **calculating a pseudo-data vector and reordering the data in the matrix based on a measure of similarity between said pseudo-data vector and measured values of said data matrix**. The Examiner attempts to overcome this lack of teaching by first, stating that Warrington teaches a relational database and that it is an inherent property of a relational database that rows or column can be sorted based on varying criteria or rules created by the designer. Second, pointing to Rusterholz (abstract, col. 4, lines 55-67 through col. 8) as teaching a method for rearranging tables of data *“using ‘pseudo-data vectors,’ i.e. arrays wherein the vector data is used for reordering”*. Third, pointing to Balaban '561 as teaching the extraction of rows based on a query that extracts all columns with a value greater than a predetermined value for some entry in the column. The Examiner asserts that this results in a reordering of the data, and that hence, the data mining taught by Balaban '561 *“incorporates the capability of sorting and reordering the expression data as it is a common goal of any data mining to be able to sort and reorder data”*.

The Examiner maintains that it would have been obvious to apply the teachings of Rusterholz and Balaban '561 to those of Warrington *“to more effectively interpret experimental data”*. The Examiner also states *“the differences between the claimed invention and the prior art*

were encompassed in known variations or in a principal known in the prior art”.

First, the claim requires that the reordering of a data matrix is performed **based on a measure of similarity between** any pseudo-data vector and measured values of said data matrix. Rusterholz teaches a method to reorder a data table, in which multi-bit “old” index values assigned to corresponding cell positions of the original table are mapped to new index values, by receiving an “ARA” (address reordering array), and performing a series of calculations that culminate in the mapping of cell contents that corresponded to each old index value to the corresponding new index value, thus creating a new table used in place of the original one. Nothing in the method taught by Rusterholz involves any consideration of similarity measures. Neither Warrington nor Balaban '561 provide the missing teachings.

Second, the fact that a reference **can** be modified to arrive at the claimed invention is not sufficient to sustain a rejection for obviousness absent some motivation for making the modification unless the number of possible choices is sufficiently small that someone of ordinary skill could explore all of them in a reasonable period of time. The number of criteria for data matrix reordering is clearly too great to allow someone to explore all criteria without some further guidance and motivation. Hence, the Examiner must provide some motivation for making the particular choice of criteria required by the current invention. Applicant submits that absent the teachings of the current invention, there would be no motivation to modify the method of Warrington to include the type of data reordering specified in claim 65. Accordingly, Applicant submits that claim 65 and the claims dependent therefrom are not obvious in view of the cited prior art

Claim 66 depends from claim 65 and additionally requires that the pseudo-data vector be generated by assigning numerical data values to a selected portion of the sample descriptive values. The Examiner points to columns 3 and 5 of Balaban '561 as providing this teaching. The cited columns refer to standard types of data mining, resulting in extraction of data from a database in response to queries based on the content of the cells of the database. First, such mining is not equivalent to **assigning** numerical data values as specified. Second, there is no

teaching that the database contents of Balaban '561 include sample descriptive values. Third, there is no teaching that the data mining of Balaban '561 would result in the **generation of a pseudo-data vector**. Hence, there are additional grounds for allowing claim 66 and the claims dependent therefrom.

Claim 67 depends from claim 66 and additionally requires that **said selected sample descriptive values to which numerical data values are assigned comprise binary data**. The Examiner points to column 5 of Rusterholz as providing this teaching. The binary data disclosed in the cited column are new and old index bit sequences. First, these sequences cannot be interpreted to be **sample descriptive values** as recited, as they simply indicate the addresses of particular data items in the database. Second, although these sequences may comprise binary data, there is no teaching that numerical data values are **assigned to** these sequences. Hence, there are additional grounds for allowing claim 67.

Typographical errors have been corrected in claims 79 and 80, making it clear that these claims depend from claim 65, not claim 1.

The Examiner rejected claims 68, 70-72, and 76-78 under 35 U.S.C. 103(a) as being unpatentable over Warrington et al. (P/N 6,884,578; no. 2 reference in IDS submitted 11/6/2008) in view of Rusterholz (US P/N 5,864,838) and further in view of Balaban et al. (6,185,561; no. 3 reference submitted in IDS 11/6/2008) as applied to claims 65-67, 69, 75, and 79-80 above and further in view of Balaban et al. (US NN 2003/0028501). Applicant submits that as currently amended, 68, 70-72, and 76-78 are not obvious in view of the cited prior art.

Claim 68 depends from claim 66 and additionally requires cells of said selected sample descriptive values be color-coded, said color-coding representing a function of the sample descriptive values in the cells. The Examiner looks to Balaban '501 for the additional teachings. The Examiner maintains that it would have been obvious to apply the teachings of Balaban '501 to those of Warrington, modified by Rusterholz and Balaban '561, *"because using color as a way*

of displaying and manipulating data is recognized by Balaban et al. ('501) as a functionality used in data manipulation and displays". As noted above, the combination of Warrington, Rusterholz and Balaban '561 fails to teach either the requirements of claim 65 regarding the reordering of a data matrix **based on a measure of similarity between** any pseudo-data vector and measured values of said data matrix, or the additional requirements of claim 66 requiring that the pseudo-data vector be calculated **by assigning numerical data values to a selected portion of the sample descriptive values**. Balaban '501 does not provide the missing teachings. Hence, claim 68 is not obvious in view of the cited prior art.

The Examiner points to Figures 4A and 9A-9F and paragraphs [0012]-[0013], [0045], and [0071] of Balaban '501 as teaching the limitations of claims 70-72 and 76-78 regarding the assignment of predefined data values.

Claim 70 depends from claim 66 through claim 68 and additionally requires that at least one cell of said data matrix lack a sample descriptive value, and wherein said calculation of said pseudo-data vector further comprises **assigning a predefined null value to said cell lacking a sample descriptive value**. First, as noted above with respect to claim 68, the cited prior art does not teach the limitations of base claim 66. Second, Applicant finds no teaching in the cited paragraphs or elsewhere in Balaban '501 that an assignment of any value is made **to a cell lacking a sample descriptive value**. Third, there is no teaching that any of the annotations made by the user of Balaban '501 is "*a preset null or negative value*" as the Examiner asserts. At most, paragraph 0071 of Balaban '501 teaches that annotations added to the display may include text, a user-defined type of the annotation, user name, date, or "other useful information". Hence, claim 70 is not obvious in view of the cited prior art.

Claim 71 depends from claim 67 and additionally requires that said assigning numerical data values to a selected portion of said sample descriptive values comprise **substituting predefined pseudo-data values for positive and negative annotative binary data values** in said selected portion of said sample descriptive values. First, as noted above, the combination of Warrington, Rusterholz and Balaban '561 does not teach the limitations of base claim 67.

Balaban '501 does not provide the missing teachings. Second, the passages cited by the Examiner in Balaban '501 do not mention **substituting** any values for values that are already present, or even "*equating*" such values as the Examiner asserts, let alone that the values being replaced are positive and negative annotative binary data values. Hence, claim 71 is not obvious in view of the cited prior art.

Claim 72 depends from claim 66 and additionally requires that the numerical data values that are assigned to said selected portion of said sample descriptive values be inverted. As noted above, the combination of Warrington, Rusterholz and Balaban '561 does not teach the limitations of base claim 66. Balaban '501 does not provide the missing teachings. Hence, claim 70 is not obvious in view of the cited prior art.

Claim 76 depends from claim 65 and additionally requires that said assigning numerical data values to a selected portion of said sample descriptive values comprise **substituting** a first predefined pseudo-data value for emphasizing each cell in a sub-portion of said selected portion of said sample descriptive values, and a second predefined pseudo-data value for de-emphasizing each remaining cell of said selected portion of said sample descriptive values. First, as noted above, the combination of Warrington, Rusterholz and Balaban '561 does not teach the limitations of base claim 65. Balaban '501 does not provide the missing teachings. Second, as noted above with respect to claim 71, the cited prior art does not teach **any** substitution of one value for another, let alone the specific type of substitutions recited in claim 76. Hence, claim 76 and the claims dependent therefrom are not obvious in view of the cited prior art.

Claim 77 depends from claim 76 and additionally requires that said first predefined pseudo-data value for emphasizing be a positive value inputted by a user. As noted above with respect to claim 70, at most, Balaban '501 teaches (paragraph 0071) that annotations added to the display may include text, a user-defined type of the annotation, user name, date, or "other useful information". There is no teaching that the user inputs a positive value as recited. Hence, there are additional grounds for allowing claim 77.

The Examiner rejected claims 73-74 under 35 U.S.C. 103(a) as being unpatentable over Warrington et al. (P/N 6,884,578; no. 2 reference in IDS submitted 11/6/2008) in view of Rusterholz (US P/N 5,864,838) and further in view of Balaban et al. (6,185,561; no. 3 reference submitted in IDS 11/6/2008) as applied to 65-67, 69, 75, and 79-80 above and further in view of Schadt et al. (US P/N 7,035,739). Applicant submits that as currently amended, claims 73-74 are not obvious in view of the cited prior art.

Claim 73 depends from claim 65 and additionally requires that said measure of similarity comprise calculating a distance value between the pseudo-data vector and a vector generated from a select set of said measured values. Claim 74 depends from claim 73 and additionally requires that said distance value be determined by calculating a squared Euclidean distance between said two vectors.

The Examiner states that the combination of Warrington, Rusterholz and Balaban '561 teaches the limitations of claims 73 and 74 except for calculating a distance value between rows assigned a similarity value wherein the calculation is a Euclidean distance. The Examiner maintains that measures of similarity based on distance values including a squared Euclidean distance are known measures of similarity, as evidenced by Schadt, and hence, it would be obvious to use these measures in data re-ordering.

First, as noted above, the combination of Warrington, Rusterholz and Balaban '561 does not teach the limitations of base claim 65. Schadt does not provide the missing teachings.

Second, Schadt teaches a clustering algorithm. The fact that certain measures of distance are known in clustering theory does not make those measures obvious as criteria for ordering records of a database. Accordingly, Applicant submits that claims 73 and 74 are not obvious in view of the cited prior art. .

Applicant submits that all claim amendments presented herein or previously are made solely in the interest of expediting allowance of the claims and should not be interpreted as

acquiescence to any rejections or ground of unpatentability. Applicant reserves the right to file at least one continuing application to pursue any subject matter that is canceled or removed from prosecution due to the amendments.

Respectfully Submitted,

A handwritten signature in cursive script, appearing to read "Calvin B. Ward".

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